

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D U 1 SEP 2005

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Applicant's or agent's file reference 103.0010PCT	<b>FOR FURTHER ACTION</b> See Form PCT/PEA/416	
International application No. PCT/IB2004/002877	International filing date ( <i>day/month/year</i> ) 02.09.2004	Priority date ( <i>day/month/year</i> ) 10.10.2003
International Patent Classification (IPC) or national classification and IPC E21B47/10		
Applicant SCHLUMBERGER SURENCO S.A. et al.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of sheets, as follows:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)), containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the opinion</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>		
Date of submission of the demand  08.06.2005	Date of completion of this report  30.08.2005	
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Manolache, I Telephone No. +49 89 2399-	



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/IB2004/002877

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
    - international search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4)
    - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

**Description, Pages**

1-21                          as originally filed

**Claims, Numbers**

1-34                          as originally filed

**Drawings, Sheets**

1/11-11/11                as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3.  The amendments have resulted in the cancellation of:
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):
4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/IB2004/002877

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes:	Claims	1-17, 19, 21-34
	No:	Claims	18, 20
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-34
Industrial applicability (IA)	Yes:	Claims	1-34
	No:	Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VII Certain defects in the international application**

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The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.  
**PCT/IB2004/002877**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

V1 Reference is made to the following documents:

D1:US-A 3 709 032

D2:US-B1 6 305 216

D3:US-B1 6 618 677

- v2 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, disclosing (the references in parentheses applying to this document) a method of determining characteristics of an injection well, comprising:
- obtaining an initial temperature profile along wellbore prior to injection (column 5, lines 21-27);
  - measuring the temperature of an injection fluid prior to injection (column 5, line 27);
  - injecting the injection fluid into the deviated wellbore (column 5, lines 27, 28);
  - establishing a temperature profile (column 5, lines 32-34); and
  - determining a flow profile for the injection fluid (column 5, lines 40, 41) based on a well model (column 5, lines 46-50) utilizing the initial temperature profile, the temperature of the injection fluid, and the temperature profile (column 5, lines 39, 40).

The method of claim 1 differs from said known method in that the temperature profile is made in a deviated borehole. Therefore, the subject-matter of claim 1 is new and the claim meets the requirement of Art. 33.2 PCT.

However, to make a temperature profile in a deviated borehole is a process already employed in D2 (fig. 4; claim 1, lines 1-4) for the same purpose of determining the characteristics of a flow rate of said borehole.

The skilled person would therefore regard a temperature profile as a normal option based on which to calculate the flow profile regardless if the borehole is vertical or deviated.

Therefore the subject-matter of claim 1 does not involve an inventive step and the claim does not meet the requirements of Art. 33(3) PCT.

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.  
**PCT/IB2004/002877**

- V3 The claims 2-12 dependant in claim 1 also do not meet the requirements of Art 33.3 PCT, theirs distinguishing features being also employed in D1 (column 4, lines 6-44, claims 1-5) and / or in D2 (fig. 2-4, column 4, claims 1-17).
- V4 Even though independent claims 13 and 18 do not meet the conciseness requirement of Art. 6 PCT (see following point VII-1), they will be briefly examined. Claim 13 does not meet the requirements of Art. 33.3 PCT because its subject-matter is anticipated in the combination of D1 (column 2, lines 54-64) and D2 (claim 1).  
Claim 18 does not meet the requirements of Art. 33.2 PCT because its subject-matter is entirely disclosed in D2 (claim 1).  
Having regard to the dependant claims 14-17, 19 and 21-26 it is pointed out that they seem to relate to minor constructional features which will be selected and used by the man skilled in the art as and when he needs them, without any inventive thought being required Art 33.3 PCT. The subject-matter of dependant claim 20 is also disclosed in D2 (claim 17). Therefore this claim also does not meet the requirements of Art. 33.2 PCT.
- V5 The document D3 is regarded as being the closest prior art to the subject-matter of claim 27, disclosing (the references in parentheses applying to this document) a system comprising:  
a temperature sensor deployed in a wellbore of an injection well to obtain temperature data along the wellbore (column 2, lines 32-41); and  
a processor system able to receive the temperature data and to utilize the temperature data in deriving a flow profile of a fluid injected along the wellbore (claim 8).  
The system of claim 27 differs from said known system in that the wellbore is an deviated borehole. Therefore, the subject-matter of claim 27 is new and the claim meets the requirement of Art. 33.2 PCT.  
However to deploy a temperature sensor in a vertical wellbore or in a deviated wellbore is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed.  
Therefore the subject-matter of claim 27 does not meet the requirements of Art. 33(3) PCT.
- V6 Having regard to the dependant claims 28-34 it is pointed out that they seem to

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.  
PCT/IB2004/002877

relate to minor constructional features which will be selected and used by the man skilled in the art as and when he needs them, without any inventive thought being required Art 33.3 PCT.

**RE ITEM VII**

- VII-1 - To satisfy the conciseness requirement of Art. 6 PCT the set of claims should include only the minimum necessary number of independent claims in any one category, with dependent claims as appropriate, Rule 6.(4) PCT. Said requirement is not satisfied by claims 1, 13 and 18, as in the present case it is considered appropriate to use only one independent method claim and one independent system claim. In view of the above objection it is not at present practicable to carry out a examination of independent claims 13 and 18 and related dependent claims.
- VII-2 - Independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art document D1 being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).